

RESTORATION ACTIONS

The general target is to increase the population size of giant garter snakes.

General programmatic actions to protect occupied habitat areas include the following:

- Implement a preservation plan to protect these areas from adverse effects associated with human encroachment and recreation,
- Create canals, side channels, and backflow pools containing emergent vegetation within the South, East, and North Delta Ecological Units of the Sacramento-San Joaquin Delta Ecological Management Zone to provide forage habitat and escape cover, and create dispersal corridors by linking habitat areas.
- Restore suitable adjacent upland habitat or modify land use practices to render existing uplands as suitable habitat and reestablish connectivity between wetland and upland habitat areas, provide nest and hibernation sites, and provide refuge habitat during floods.
- Create buffer zones where none currently exist to improve habitat value.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would help achieve giant garter snake habitat or population targets.

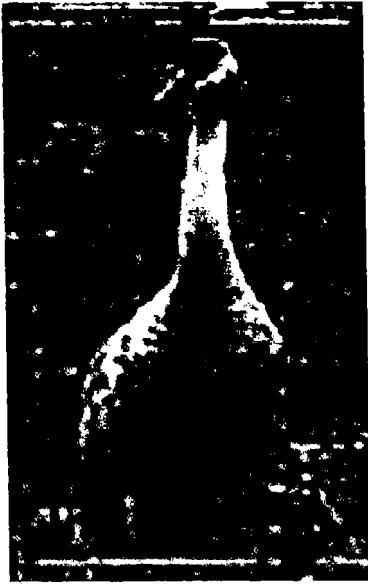
- A substantial portion of tidal wetlands to be restored under the ERP should be restored in the North Delta (the Yolo Basin and Bypass)
- To the extent consistent with CALFED objectives, protect existing and restore additional habitat in the east Delta to create a corridor of suitable habitat linking Stone Lakes, the Cosumnes River, and White Slough.
- To the extent practicable, design setback levees in the restored Stone Lakes/Cosumnes River/White Slough habitat corridor to include a mosaic of habitats.

- Identify opportunities for implementing levee maintenance practices in the Delta that will maintain suitable levee habitat or minimize the impacts of necessary maintenance on the species and its habitat.
- Incorporate restoration of permanent or seasonal flooded (April-October) suitable habitat areas as part of a mosaic of the seasonal wetland and agricultural land enhancements to be implemented under the ERP.
- To the extent consistent with CALFED objectives, locate ERP nontidal marsh restorations near existing occupied habitat areas and design restorations to include suitable upland habitat areas at least 200 feet around restored wetlands.
- Include improvements to and maintenance of suitable agricultural infrastructure habitat (i.e., ditches, drains, canals, and levees) as part of ERP actions to improve wildlife habitat values associated with agricultural lands.
- To the extent consistent with CALFED objectives, manage lands purchased or acquired under conservation easements that are occupied by the species to maintain or increase their current population levels.
- Monitor suitable wetlands restored in the Delta Region adjacent to or near occupied habitats to assess if and when (relative to habitat maturity) giant garter snake occupy restored habitat or to identify reasons they are not using restored and apparently suitable habitat.

REFERENCES

- Multi-Species Conservation Strategy. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.
- Strategic Plan for Ecosystem Restoration. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.

◆ GREATER SANDHILL CRANE



INTRODUCTION

This subspecies of the sandhill crane primarily winters in the Delta and forages and roosts in agricultural fields and pastures. Because the winter range of the greater sandhill crane overlaps the winter range of other sandhill crane subspecies, all subspecies are considered important resources. The greater sandhill crane population has declined primarily as a result of loss of suitable wetland nesting habitats. The loss of habitat and declining condition of the subspecies' population have warranted its listing as threatened under the California Endangered Species Act. Major factors that limit this resource's contribution to the health of the Bay-Delta are related to adverse effects of conversion of grassland and wetland habitats for agricultural, industrial, and urban uses.

RESOURCE DESCRIPTION

The greater sandhill crane is an important part of the biological integrity and health of the Bay-Delta and Sacramento-San Joaquin Valley ecosystems. The greater sandhill crane is found throughout most of the Central Valley in winter and nests in northeastern California and Oregon.

Habitats used by the sandhill crane include seasonal and fresh emergent wetlands, grasslands, and agricultural lands. Large wintering populations of

greater and lesser sandhill cranes congregate in the Sacramento and San Joaquin Valleys. Generally, crane wintering habitat consists of shallowly flooded grasslands that are used as loafing and roosting sites and nearby agricultural areas that provide food sources include rice, sorghum, barley, and corn. In the Delta, in adequate roost sites, relatively free from disturbance and quality and quantity of forage, are potential limiting factors on the wintering population.

The State-listed greater sandhill crane is a fully protected species because the small remaining population depends on habitat that is threatened with loss or degradation. The conversion of grasslands, wetlands, and agricultural land to urban development is an ongoing process that is not likely to be reversed. The sandhill crane now depends primarily on artificially created areas where natural wetland and grassland habitats have been eliminated. Disturbance associated with human activities, illegal harvest, and predation have also affected the overall health of the crane population, although less severely than the loss and degradation of its habitats.



VISION

The vision for the greater sandhill crane is to contribute to the recovery of this State-listed threatened species in the Bay-Delta.

Recovery of the greater sandhill crane would contribute to overall species richness and diversity. Achieving this vision will reduce conflict between the need for its protection and other beneficial uses of land and water in the Bay-Delta.

Maintenance of healthy populations of other sandhill crane subspecies will also improve by providing sufficient wintering habitat in the Bay-Delta. Habitat restoration there in the Sacramento-San Joaquin Delta Ecological Management Zone will help maintain healthy populations.

The greater sandhill crane will benefit from restoration of shallowly flooded wetlands. Implementing existing crane recovery and waterfowl management plans will also help achieve this vision. Such strategies could be implemented through

collaborative work with organizations to maintain and improve existing preserves, cooperative agreements with land management agencies, or conservation easements or purchase from willing sellers.

Restoration of ecosystem processes and habitats in other ecological management zones will also allow seasonal and fresh emergent wetlands and grasslands to develop that will provide habitat for wintering sandhill cranes elsewhere in the Central Valley.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Restoration of sandhill cranes in the Central Valley is conducted by the following programs:

- A Pacific Flyway Management Plan for the Central Valley population of greater sandhill cranes to recover the population has been developed and is being implemented by the U.S. Fish and Wildlife Service and the California and Oregon Departments of Fish and Game.
- The Central Valley Habitat Joint Venture Implementation Plan contains goals to protect and restore Central Valley aquatic and upland habitats that are needed for waterfowl. This plan provides indirect benefits for the greater sandhill crane and other species that use these wetland and upland habitats.
- California Department of Fish and Game and The Nature Conservancy are working to protect and restore crane habitat in the area of the Woodbridge Ecological Reserve and the Cosumnes River Preserve.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Restoration and recovery of the greater sandhill crane population of the Central Valley is integrally linked with wetland and riparian habitat restoration, and agricultural habitat improvement.

OBJECTIVE, TARGETS, ACTIONS, AND MEASURES



The Strategic Objective is to contribute to the recovery of at-risk native species in the Bay-Delta estuary and its watershed.

SPECIES TARGET: Achieve recovery objectives identified in the Pacific Flyway Management Plan for the Central Valley population of greater sandhill cranes and Assembly Bill (AB) 1280 legislation that applicable to CALFED problem area, the Butte Sink, and other species' use areas.

LONG-TERM OBJECTIVE: Restore roosting, foraging, and loafing habitat for the greater sandhill crane in the Central Valley.

SHORT-TERM OBJECTIVE: Restore populations to the point where the crane can be removed from the state threatened species list.

RATIONALE: The greater sandhill crane is a spectacular bird that listed as threatened in California and fully protected under the Fish and Game Code. It is a year around resident, nesting in grasslands and wetlands. Much of their nesting habitat has been lost to agricultural conversion and intensive cattle grazing. They will forage in moist cropland and as well as in emergent wetlands, newly planted and sprouting crops, harvested crops, fallow fields, uncultivated areas, canals and irrigation ditch banks. Greater sandhill cranes prefer open areas with shallow fresh water for drinking and bathing. Most winter in the Delta region and require protected roosting habitat near dormant agricultural fields in which they forage.

STAGE 1 EXPECTATIONS: A program will have been implemented to protect wintering (foraging, roosting, and loafing habitats) habitat that already exists and maintain population size. Current populations within the Central Valley will have been monitored.

RESTORATION ACTIONS

General targets for greater sandhill crane are to:

- Increase the number of greater sandhill cranes in the Central Valley population,

- Increase the distribution of greater sandhill crane in the Central Valley,
- Decrease disturbance at roosting sites due to waterfowl, pheasant, and rabbit hunters, and
- Increase the number and sizes of "closed areas" on wildlife areas to provide undisturbed areas for the crane.

General programmatic actions to contribute to the recovery of greater sandhill crane include:

- Protect existing habitats and restore additional suitable seasonal and fresh emergent wetlands grasslands, riparian woodlands, fallow fields, and harvested fields,
- Increase the number of duck clubs that retain water after the waterfowl season ends, and
- Improve agricultural land management to reduce disturbance caused by human activities.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would help achieve greater sandhill crane habitat or population targets.

- To the extent consistent with Program objectives, implement ERP actions in concert with the species recovery strategies identified in AB 1280 and the Pacific Flyway Plan.
- Implementation of proposed ERP actions to enhance agricultural habitats should give priority to improving the abundance and availability of upland agricultural forage (e.g., corn and winter wheat) in the core use area centered around Bract Tract.
- Implementation of proposed ERP actions to restore wetlands should give priority to restoring and managing wetland habitat area within the core use area centered on Bract Tract that would provide suitable roosting habitat.
- Avoid or minimize recreational uses in the core area centered on Bract Tract that could disrupt crane habitat use patterns from October-March.

- To the extent consistent with Program objectives, at least 10% of agricultural lands to be enhanced under the ERP in the Delta and the Butte Sink should be managed to increase forage abundance and availability for cranes. Priority should be given to implementing these habitat improvements within 10 miles of core habitat area centered on Bract Tract.
- Monitor to determine use of protected, restored, and enhanced habitats by sandhill cranes in core wintering areas.

REFERENCES

- Multi-Species Conservation Strategy. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.
- Strategic Plan for Ecosystem Restoration. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.

◆ CALIFORNIA YELLOW WARBLER

INTRODUCTION

As a neotropical migrant, the California yellow warbler is present in California from April to October. During these months the California yellow warbler primarily utilizes underbrush of open deciduous riparian woodlands for home territories, foraging areas and nesting sites. Recently, breeding populations in valley areas have been declining due to destruction of riparian habitats as well as nest parasitism by the brown-headed cowbirds. Due to a consistent, gradual decline of breeding populations in California, the California yellow warbler has been listed as a California Species of Special Concern.

RESOURCE DESCRIPTION

California yellow warblers summer throughout northern California and in the coastal regions of southern California. In recent decades there has been a marked decline in the breeding population of California yellow warblers in the San Joaquin and Sacramento valleys. Once common in these areas, the California yellow warbler has been displaced due to loss of riparian habitat caused by agricultural and urban development.

Another cause of breeding population decline is brood parasitism by brown-headed cowbirds. Brood parasitism by cowbirds has been documented to lower the reproductive success of warblers. In areas where cowbird populations are high the population numbers of California yellow warblers are very low despite the quality of habitat, therefore, decline of warbler populations due to parasitism can be attributed to loss of the birds' common habitat. As habitat decreases both birds must use more common habitat for foraging and territory creating a situation where California yellow warblers are more accessible and therefore more easily parasitized by brown-headed cowbirds.



VISION

The vision for the California yellow warbler is to contribute to the recovery of this California species of special concern.

This will be accomplished by increasing the size and quality of riparian habitats in California, especially in those areas with high populations of brown-headed cowbirds. By increasing the area of riparian habitats, the California yellow warbler and the brown-headed cowbird populations will not be as compacted. Greater areas of riparian habitat and lowering population densities of yellow warblers and cowbirds will allow for higher population numbers of passerine species that the cowbird can also parasitize. With more habitat and greater numbers of those species that the cowbird can parasitize, the rate at which California yellow warblers are being parasitized should decrease. Furthermore, by creating more riparian habitat and improving the quality of existing habitat, a more diverse and sustainable riparian community will be created.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Related restoration programs include:

- Central Valley Project Improvement Act,
- Cache Creek Corridor Restoration Plan,
- Cosumnes River Preserve,
- Riparian Habitat Joint Venture,
- Upper Sacramento River Advisory Council's Riparian Habitat Committee (SB 1086 program),
- San Joaquin River Management Program, and
- U.S. Fish and Wildlife Service's Anadromous Fish Restoration Plan.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Restoration of the California yellow warbler and its riparian habitat is linked to restoring healthy and diverse riparian communities throughout California.

OBJECTIVE, TARGETS, ACTIONS, AND MEASURES



The Strategic Objective is to contribute to the recovery of at-risk native species in the Bay-Delta estuary and its watershed.

SPECIES TARGET: Maintain and enhance suitable riparian corridor migration habitats and restore suitable breeding habitat within the historic breeding range of these species in the Central Valley.

LONG-TERM OBJECTIVES: Substantially improve breeding and migration habitats for all neotropical migrant birds to increase their rates of reproduction and survival.

SHORT-TERM OBJECTIVES: Maintain breeding populations at present levels and develop restoration projects that will benefit migrating individuals.

RATIONALE: Neotropical migratory birds constitute a diverse group of largely passerine songbirds that overwinter in the tropics but breed in or migrate through the Central Valley and Bay-Delta region. As a group, they are in decline because of loss of habitat on their breeding grounds, in their migratory corridors, and in their wintering grounds. The species within this group are good indicators of habitat quality and diversity and their popularity with birders means that populations are tracked and have high public interest. They can also be good indicators of contaminant levels, by monitoring reproductive success and survival in areas near sources of contamination. Riparian forests are particularly important to this group because they are major migration corridors and breeding habitat for many species. By providing improved nesting and migratory habitat, it may be possible to partially compensate for increased mortality rates in the wintering grounds. Improved habitat for songbirds also provides habitat for many other species of animals and plants.

STAGE 1 EXPECTATIONS: A "master plan" will have been developed for the conservation of neotropical migrants in the Bay-Delta watershed that includes status reports and habitat requirements for all species. This information will have been used to integrate neotropical migrant conservation into

various restoration projects or to develop restoration projects specifically aimed at improving migration and breeding habitat for selected members of this group.

RESTORATION ACTIONS

The following targets will aid in achieving the implementation objective:

- Increase breeding numbers of California yellow warblers throughout California.
- Reduce the amount of brood parasitism by brown-headed cowbirds on California yellow warblers.

The following programmatic actions will contribute to the recovery of the California yellow warbler:

- Increase the amount of riparian habitat throughout California
- Improve the quality of disturbed riparian habitat

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would help achieve California yellow warbler habitat or population targets.

- Coordinate protection and restoration of riparian habitat areas with other federal and state programs (e.g., the Riparian Habitat Joint Venture, the SB 1086 Program, and the Corps' Sacramento and San Joaquin Basin Comprehensive Study) that could affect management of occupied and historic habitat areas to avoid potential conflicts among management objectives and identify opportunities for achieving multiple management objectives.
- To the extent consistent with CALFED objectives, protect existing suitable riparian habitat corridors from potential future changes in land use or other activities that could result in the loss or degradation of habitat

- A portion of restored riparian habitat area should be designed to include riparian scrub communities.
- To the extent practicable, restore riparian habitat in patch sizes sufficient to discourage nest parasitism by brown-headed cowbirds..

REFERENCES

- Multi-Species Conservation Strategy. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.
- Strategic Plan for Ecosystem Restoration. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.—
- Warner, R.E., and K.M. Hendrix. 1984. California Riparian Systems. Berkeley: University of California Press. pg. 605.
- Zeiner, D.C., ed., et al. 1990. California's Wildlife. Sacramento: California Department of Fish and Game. pp. 568, 652.

◆ LITTLE WILLOW FLYCATCHER

INTRODUCTION

The little willow flycatcher is one of many neotropical migrants which is a relatively widespread summer resident in wooded settings near water and open areas. It prefers dense shrub cover to timber, especially willow thickets. It is dependent upon the flora of California to forage and reproduce, typically from about May until September. The rest of the year is normally spent in Central America and South America.

Efforts to protect and restore the habitat needed to attain a healthy state for this species will not only require the restoration of a number of ecological process and functions, but will also require the combined efforts of federal, state, private organizations, and landowners to provide sufficient restored and improved habitat for the survival of this species.

RESOURCE DESCRIPTION

Habitats used by this species include forested woodland, riparian, unforested lowlands, grasslands, montane riparian habitats, and shrub habitats near open areas or water. These habitats have been and continue to be lost due to the alteration of habitat by agricultural conversions and urban land development.



VISION

The vision for the little willow flycatcher is to contribute to the recovery of this State-listed endangered species.

Recovery of the little willow flycatcher would contribute to overall species richness and diversity. Achieving this vision will reduce conflict between the need for its protection and other beneficial uses of land and water in the Bay-Delta. The vision will be attained by improving nesting and foraging habitat in the Central Valley and foothills of the State through the restoration of natural processes and functions which will help lead to sustained healthy populations. Restoring broad bands of dense willow-cottonwood riparian and riparian scrub habitat will contribute to sustaining improved ecosystem

processes and functions to restore the health of aquatic and terrestrial resources in and dependent on the riverine and riparian systems. While attaining this vision, habitat improvements will support an increased level of production of insects and other macro invertebrates which are important elements of the food web for fish and wildlife including rearing chinook salmon.

The restored riparian habitat and natural processes in the relevant ecological management zones will improve river and channel water temperatures, and support stream meander and flood processes that will all contribute to improving the ecological health of the aquatic resources in and dependent on the Bay-Delta. This vision is congruent with CALFED's vision to restore the Bay-Delta ecosystem to a healthy state for listed fish and wildlife.

INTEGRATION WITH OTHER RESTORATION PROGRAMS

Examples of related restoration programs include the following:

- Central Valley Project Improvement Act;
- Cache Creek Corridor Restoration Plan;
- Cosumnes River Preserve;
- Riparian Habitat Joint Venture;
- Upper Sacramento River Advisory Council's Riparian Habitat Committee (SB 1086 Program);
- San Joaquin River Management Program; and,
- U.S. Fish and Wildlife Service's Anadromous Fish Restoration Plan.

All these programs will play important and integral roles, coordinated through CALFED, to achieve the vision for the little willow flycatcher.

LINKAGE WITH OTHER ECOSYSTEM ELEMENTS

Efforts to protect and restore the habitat needed to attain a healthy state for this species will not only require the restoration of a number of ecological process and functions, but will also require the combined efforts of federal, state, private organizations, and landowners to provide sufficient

restored and improved habitat for the survival of this species.

ECOSYSTEM PROCESSES. The primary ecological processes that help recruit neotropical migrants include nutrient inputs and vegetation succession. These two processes supply the food and cover components required such as the invertebrates which invariably become prey items. These processes are currently influenced by land uses and other human disturbances and their restoration is vital to improve ecological health of the Bay-Delta. Through the restoration of several ecological process including stream meander belts, vegetation succession, overbank flooding, floodplain inundation, and secondary production the essential elements needed by this species will be restored to improve the food web as well as provide optimum breeding and roosting habitat.

HABITAT. The primary threat to neotropical migratory birds has been, and continues to be, loss and alteration of habitat by agricultural conversion (plowing and leveling of land), river channelization, dam construction, drainage and pipeline construction. The little willow flycatcher and other species' nests are parasitized by brown-headed cowbirds when adequate vegetative cover is not available. Species that are deep forest nesters have been the most adversely affected by habitat fragmentation.

Restoration of habitats used by neotropical birds such as riparian, perennial grasslands, and oak woodlands, in conjunction with restoring related ecosystem functions and processes, will be the primary approach used to achieve CALFED's vision. Large scale restoration of nesting habitat will help reduce nest parasitism and predation.

STRESSORS. Stressors at one time or another contribute to reduced reproductive success of neotropical avian species. Land use, human disturbance, elevated levels of competition and predation by exotic species, wildfire, and contaminants are all stressors that affect the ecological health of this species. For instance, insect populations that form the base of the food web can be severely impacted by pesticide drift from nearby agricultural lands.

Reducing the effects of stressors will be a major factor in preventing further loss of existing nesting and

foraging habitat. Where consistent with flood control needs, modification of levees and bank protection measures which would otherwise inhibit the natural establishment of vegetation succession will allow areas to naturally change over time. By controlling human disturbance in nesting areas and improving water management a number of species will benefit. The implementation of fire breaks and other types of buffers would be useful in preventing the adverse impacts of wildfires.

OBJECTIVE, TARGETS, ACTIONS, AND MEASURES



The Strategic Objective is to contribute to the recovery of at-risk native species in the Bay-Delta estuary and its watershed.

SPECIES TARGET: Maintain and enhance suitable riparian corridor migration habitats and restore suitable breeding habitat within the historic breeding range of this species in the Central Valley.

LONG-TERM OBJECTIVE: Restore little willow flycatcher to abundance throughout its native range by protecting and restoring contiguous expanses of montane riparian habitats in the Sierra Nevada and Cascade ranges.

SHORT-TERM OBJECTIVE: Have enough self-sustaining populations of little willow flycatcher so that the species can be removed from the state list of endangered species.

RATIONALE: The little willow flycatcher is a neotropical migrant bird that is listed by the state as endangered and by federal government as a species of concern. Little willow flycatchers nest and roost in montane riparian habitats in the Sierra Nevada and Cascade ranges consisting of dense willow thickets. Lower exposed perches provide singing and hunting platforms. In areas that are heavily grazed by cattle little willow flycatchers are absent from areas that appear to provide suitable habitat. Restoration of this bird will presumably require restoring large expanses of riparian thickets within the habitat ranges of the little willow flycatcher, in part by excluding cattle grazing.

STAGE 1 EXPECTATIONS: The range within California of the little willow flycatcher will have

been determined and measures to protect and enhance remaining habitat areas will have been implemented.

RESTORATION ACTIONS

The target for restoring the neotropical migratory birds including the little willow flycatcher is to restore riparian habitat in the Delta Ecological Management Zone, the Sacramento River Ecological Management Zone, and the San Joaquin Ecological Management Zone. The actions proposed to achieve this target will be implemented in conjunction with actions taken by CALFED members and cooperating agencies to restore aquatic resources in and dependent on the Bay-Delta

The following are potential actions that if implemented by themselves or in combination would help achieve the short and long-term targets:

- Set back levees to create hydrologic conditions necessary for seasonal flooding and vegetation succession.
- Establish programs for landowners that provide incentives for the establishment and maintenance of shaded riverine aquatic and oak woodland habitat.
- Modify, where consistent with flood control objectives, vegetation management practices along levees to allow for the natural reestablishment of shaded riverine aquatic vegetation.
- Develop and implement alternatives to land management practices on public lands that now continue to degrade woodland and shaded riverine aquatic habitat quality or inhibit recovery and provide incentives to landowners for implementing more desirable land use practices.
- Protect 50 percent of existing habitat areas from potential future degradation through acquisition of conservation easements or in-fee title.

MSCS CONSERVATION MEASURES

The following conservation measures were included in the Multi-Species Conservation Strategy (2000) to provide additional detail to ERP actions that would

help achieve little willow flycatcher habitat or population targets.

- Coordinate protection and restoration of riparian habitat areas with other federal and state programs (e.g., the Riparian Habitat Joint Venture, the SB 1086 Program, and the Corps' Sacramento and San Joaquin Basin Comprehensive Study) that could affect management of occupied and historic habitat areas to avoid potential conflicts among management objectives and identify opportunities for achieving multiple management objectives.
- To the extent consistent with CALFED objectives, protect existing suitable riparian habitat corridors from potential future changes in land use or other activities that could result in the loss or degradation of habitat
- A portion of restored riparian habitat area should be designed to include riparian scrub communities.
- To the extent practicable, restore riparian habitat in patch sizes sufficient to discourage nest parasitism by brown-headed cowbirds..

REFERENCES

- Multi-Species Conservation Strategy. 2000. CALFED Bay-Delta Program, Programmatic EIS/EIR Technical Appendix. July 2000.
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